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United States Department of Agriculture

AGRICULTURAL MARKETING SERVICE

SERVICE AND REGULATORY ANNOUNCEMENTS NO. 171

**OFFICIAL UNITED STATES STANDARDS FOR GRADES OF
PORK CARCASSES (BARROW AND GILT; SOW)**

(Title 7, Chapter 1, Part 53, Subpart B, Sections 53.140-53.145 of the Code of Federal Regulations)

The following is a reprint of the official United States standards for the grades of pork carcasses promulgated under the Agricultural Marketing Act of 1946 (60 Stat. 1087, as amended by Public Law 272, 84th Congress; 7 U. S. C. 1621 et seq.). The standards for barrow and gilt carcasses as reprinted herein were issued effective September 12, 1952 and later amended effective July 5, 1955. The standards for sow carcasses are reprinted as adopted effective September 1, 1956.

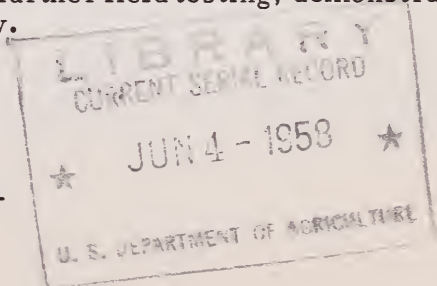
DEVELOPMENT OF THE STANDARDS

Tentative standards for grades of pork carcasses and fresh pork cuts were issued by the United States Department of Agriculture in 1931. These tentative standards were slightly revised in 1933 and published in Circular No. 288.

New standards for grades of barrow and gilt carcasses were proposed by the United States Department of Agriculture in 1949. These standards represented the first application of objective measurements as guides to grades for pork carcasses. Slight revisions were made in the proposed standards prior to promulgation, by the Secretary of Agriculture, as the official United States standards for grades of barrow and gilt carcasses, effective September 12, 1952.

The official standards were amended in July 1955, by changing the grade designations Choice No. 1, Choice No. 2, and Choice No. 3 to U. S. No. 1, U. S. No. 2, and U. S. No. 3, respectively. In addition, the backfat thickness requirements were reduced for each grade and the descriptive specifications were reworded slightly to reflect the reduced fat thickness requirements and to allow more uniform interpretation of the standards.

New standards for sow carcasses were proposed April 27, 1956. These were developed after field testing to establish similar relationships between backfat thickness and yield of cuts as applied in the barrow and gilt standards. These standards were adopted effective on September 1, 1956 following further field testing, demonstrations, and discussions with industry.



BASES FOR PORK CARCASS STANDARDS

The standards for pork carcasses developed by the United States Department of Agriculture provide for segregation according to (a) class, as determined by the apparent sex condition of the animal at the time of slaughter, and (b) grade, which reflects quality of pork and the relative proportion of lean cuts to fat cuts in the carcass.

PORK CARCASS CLASSES

The five classes of pork carcasses, comparable to the same five classes of slaughter hogs, are barrow, gilt, sow, stag, and boar carcasses.

APPLICATION OF STANDARDS FOR GRADES OF BARROW AND GILT CARCASSES

Differences in barrow and gilt carcasses due to sex condition are minor, and the grade standards are equally applicable for grading both classes.

Barrow and gilt carcasses are graded primarily on the basis of (1) differences in yields of lean cuts and of fat cuts, and (2) differences in quality of cuts. These factors vary rather uniformly and consistently from one grade to another. The U. S. No. 1 grade combines an optimum ratio of lean to fat with quality characteristics indicative of acceptable palatability. U. S. No. 2 and U. S. No. 3 grades have higher degrees of finish with resulting lower yields of lean cuts and higher yields of fat cuts than U. S. No. 1 grade. In addition, the cuts from U. S. No. 2 and U. S. No. 3 grades have more internal fat remaining after trimming of external fat than do the cuts from U. S. No. 1 grade carcasses. Medium grade carcasses have a lower degree of finish and a resulting higher ratio of lean to fat than U. S. No. 1, U. S. No. 2, and U. S. No. 3 grades; however, Medium grade carcasses are underfinished and lack the quality characteristics associated with acceptable palatability as evidenced by a lack of firmness and indications of little or no marbling in the lean. Cull grade carcasses are decidedly underfinished and the pork is soft and watery with no visible marbling. Only carcasses with the firmness appropriate to their degree of finish are included under the standards described in this part. However, carcasses which are typically soft or oily as a result of feeds producing soft or oily fat may be graded in accordance with these standards provided they are specially identified as soft or oily along with the grade.

Measurements of average backfat thickness in relation to carcass weight or length are closely related to yields of cuts and the quality of the cuts. The following table of measurements provides an objective guide in determining the barrow and gilt carcass grades.

Weight and measurement guides to grades for barrow and gilt carcasses

| Carcass weight or carcass length ¹ | Average back fat thickness (inches) ² by grade | | | | |
|---|---|--------------|---------------|--------------|----------------|
| | U. S. No. 1 | U. S. No. 2 | U. S. No. 3 | Medium | Cull |
| Under 120 pounds or under 27 inches. | 1.2 to 1.5-- | 1.5 to 1.8-- | 1.8 or more-- | 0.9 to 1.2-- | Less than 0.9. |
| 120 to 164 pounds or 27 to 29.9 inches. | 1.3 to 1.6-- | 1.6 to 1.9-- | 1.9 or more-- | 1.0 to 1.3-- | Less than 1.0. |
| 165 to 209 pounds or 30 to 32.9 inches. | 1.4 to 1.7-- | 1.7 to 2.0-- | 2.0 or more-- | 1.1 to 1.4-- | Less than 1.1. |
| 210 or more pounds or 33 or more inches. | 1.5 to 1.8-- | 1.8 to 2.1-- | 2.1 or more-- | 1.2 to 1.5-- | Less than 1.2. |

¹ Either carcass weight or length may be used with back fat thickness as a reliable guide to grade. The table shows the normal length range for given weights. In extreme cases where the use of length with back fat thickness indicates a different grade than by using weight, final grade is determined subjectively as provided in the standards. Carcass weight is based on a chilled, packer style carcass. Carcass length is measured from the forward point of the aitch bone to the forward edge of the first rib.

² Average of measurements made opposite the first and last ribs and last lumbar vertebra.

The standards for grades of barrow and gilt carcasses include carcass measurements and descriptions of carcass characteristics which indicate the lean and fat yields and imply the quality of meat typical of the minimum degree of finish of each grade. Visual estimates of fat thickness normally alleviate the necessity for measuring carcasses in the grading operation. In addition to the measurement guides to grade differences, the standards also provide the basis for consideration of other characteristics. While carcass measurements furnish a reliable general guide to grade, the final grade of borderline carcasses may vary from that indicated by measurements due to consideration of other characteristics such as visual evidences of quality; meatiness; conformation of hams, loins, bellies, and shoulders; and fat distribution. However, application of these additional factors is limited to borderline carcasses, and in no case may the final grade be more than one-half of the width of a grade different than that indicated by carcass measurements. The standards describe carcasses typical of each grade and no attempt is made to describe the nearly limitless number of combinations of characteristics that may qualify a carcass for a particular grade.

SPECIFICATIONS FOR OFFICIAL UNITED STATES STANDARDS FOR GRADES OF BARROW AND GILT CARCASSES

U. S. NO. 1

Carcasses in this grade have near the minimum degree of finish required for the production of acceptable quality cuts. Meatiness based on yield of lean cuts in relation to carcass weight is slightly high; yield of fat cuts is slightly low. The ratio of total lean and fat to bone is slightly high. Carcasses possessing the minimum finish for U. S. No. 1 grade are slightly wide and moderately long in relation to weight. The back and loins are moderately full and thick with a well-rounded appearance. Hams are usually moderately thick, plump, and smooth and are slightly full in the lower part toward the hocks. Bellies are moderately long and smooth, slightly thick, and moderately uniform in thickness; the belly pocket is

slightly thick. Shoulders are slightly thick and full but usually blend smoothly into the sides. The carcass is moderately well-balanced and smooth with moderately uniform development of the various parts. There are moderate quantities of interior fat in the region of the pelvis, a slightly thin but fairly extensive layer of fat lining the inside surface of the ribs, and a slightly small quantity of feathering. The flesh is firm. Both exterior and interior fats are firm, white, and of excellent quality. Carcasses with fat thickness typical of the thinner one-half of the U. S. No. 1 grade but with the firmness, quantity and distribution of interior fats, and belly thickness typical of the Medium grade shall be graded Medium. Carcasses with fat thickness typical of the fatter one-half of the U. S. No. 1 grade but with the fat distribution, meatiness, and thickness and fullness of hams, loins, shoulders, and bellies typical of the U. S. No. 2 grade shall be graded U. S. No. 2.

U. S. NO. 2

Carcasses in this grade have a higher degree of finish than the minimum required for the production of acceptable quality cuts. Meatiness based on yield of lean cuts in relation to carcass weight is slightly low; yield of fat cuts is slightly high. The ratio of total lean and fat to bone is moderately high. Carcasses with the minimum finish for U. S. No. 2 grade are moderately wide and slightly short in relation to weight. The back and loins are full and thick and appear fuller near the edges than at the center. Hams are usually thick, plump, and smooth and are moderately full in the lower part toward the hocks. Bellies are moderately thick, smooth, slightly short, and rather uniform in thickness; the belly pocket is moderately thick. Shoulders are moderately thick and full but usually blend smoothly into the sides. The carcass is well-balanced and smooth with rather uniform development of the various parts. There are slightly large quantities of interior fat in the region of the pelvis, a slightly thick and moderately extensive layer of fat lining the inside surface of the ribs, and moderate feathering. The flesh is firm. Both exterior and interior fats are firm, white, and of excellent quality. Carcasses with fat thickness typical of the thinner one-half of the U. S. No. 2 grade but with the fat distribution, meatiness, and thickness and fullness of hams, loins, shoulders, and bellies typical of the U. S. No. 1 grade shall be graded U. S. No. 1. Carcasses with fat thickness typical of the fatter one-half of the U. S. No. 2 grade but with the fat distribution, meatiness, and thickness and fullness of hams, loins, shoulders, and bellies typical of the U. S. No. 3 grade shall be graded U. S. No. 3.

U. S. NO. 3

Carcasses in this grade have a decidedly higher degree of finish than the minimum required for the production of acceptable quality cuts. Meatiness based on yield of lean cuts in relation to carcass weight is low; yield of fat cuts is high. The ratio of total lean and fat to bone is high. Carcasses with the minimum finish for U. S. No. 3 are wide and short in relation to weight. The back and loins are very full and thick and appear especially full near the edges. Hams are usually thick, very plump, and smooth and are full in the lower part toward the hocks. Bellies are short, thick, smooth, and uniform in thickness; the belly pocket is thick. Shoulders are thick

and full but usually blend smoothly into the sides. The carcass is well-balanced and smooth with uniform development of the various parts. There are large quantities of interior fat in the region of the pelvis, a moderately thick and extensive layer of fat lining the inside surface of the ribs, and slightly abundant feathering. The flesh is firm. Both exterior and interior fats are firm, white, and of excellent quality. Carcasses with nearly minimum fat thickness for the U. S. No. 3 grade but with the fat distribution, meatiness, and thickness and fullness of hams, loins, shoulders, and bellies typical of the U. S. No. 2 grade shall be graded U. S. No. 2.

MEDIUM

Carcasses in this grade have a lower degree of finish than the minimum required for the production of acceptable quality cuts. Yield of lean cuts in relation to carcass weight is moderately high; yield of fat cuts is moderately low. The ratio of total lean and fat to bone is moderately low. Carcasses with the minimum finish for Medium grade are rather narrow and long in relation to weight. The back and loins are rather thin and deficient in fullness and slope away from the center toward the sides. Hams are usually slightly thin and lacking in plumpness and taper slightly toward the hocks. Bellies are moderately thin, long, slightly wrinkled, and moderately uneven in thickness; the belly pocket is moderately thin. Shoulders tend to be thin and flat but often show prominence at the junction with the sides. The carcass tends to be uneven and rough with slightly irregular development of the various parts. There are slightly small quantities of interior fat in the region of the pelvis, a scanty and incomplete layer of fat lining the inside surface of the ribs, and only a small quantity of feathering. Both exterior and interior fats are moderately soft, white to creamy white, and of low quality. The flesh is moderately soft and has little evidence of marbling. Carcasses with the fat thickness typical of the fatter one-half of the Medium grade but with the firmness, quantity and distribution of interior fats, and belly thickness typical of the U. S. No. 1 grade shall be graded U. S. No. 1. Carcasses with the fat thickness typical of the thinner one-half of the Medium grade but with the firmness, quantity and distribution of interior fats, and belly thickness typical of the Cull grade shall be graded Cull.

CULL

Carcasses in this grade have a considerably lower degree of finish than the minimum required for the production of acceptable quality cuts, and most cuts are suitable only for processing. Yield of lean cuts in relation to carcass weight is high; yield of fat cuts is low. The ratio of total lean and fat to bone is low. Carcasses with the degree of finish typical of the Cull grade are narrow and long in relation to weight. The back and loins are thin and decidedly lacking in fullness and have a definite slope away from the center toward the sides. Hams are usually thin, flat, and wrinkled, and show a definite taper toward the hocks. Bellies are very long, thin, wrinkled, and uneven in thickness; the belly pocket is very thin. Shoulders are thin and flat but often prominent at the junction with the sides. The carcass is uneven and rough with irregular development of the various parts. There are only

small quantities of interior fat in the region of the pelvis and little or no fat as lining on the inside surface of the ribs or as feathering between the ribs. Both exterior and interior fats are soft, creamy white to white, and of low quality. The flesh is soft and watery and has no evidence of marbling. Carcasses with nearly maximum fat thickness for the Cull grade but with the firmness, quantity and distribution of interior fats, and belly thickness typical of the Medium grade shall be graded Medium.

APPLICATION OF STANDARDS FOR GRADES OF SOW CARCASSES

The standards for grades of sow carcasses are based on (1) differences in yields of lean cuts and of fat cuts and (2) differences in quality of cuts. There are rather uniform differences in these characteristics from one grade to another. The U. S. No. 1 grade has about the minimum degree of finish required to produce cuts of acceptable palatability. The four major trimmed lean cuts--hams, loins, picnics, and butts--normally make up more than 48 percent of carcass weight. The U. S. No. 2 and U. S. No. 3 grades have successively higher degrees of finish resulting in lower yields of lean cuts and higher yields of fat cuts than U. S. No. 1 grade. Yields of lean cuts average 45 to 48 percent and under 45 percent of carcass weight, respectively, for U. S. No. 2 and U. S. No. 3 grades. In addition, the cuts from these grades have more fat remaining after trimming of external fat than do the cuts from U. S. No. 1 grade carcasses. Medium grade carcasses are underfinished and exhibit the lack of firmness and indications of little or no marbling (fat interspersed within the lean) associated with low palatability. Cull grade carcasses are decidedly underfinished and the pork is soft with very little evidence of marbling and is of low palatability.

The standards for grades of sow carcasses apply only to carcasses with the firmness appropriate to their degree of finish. However, carcasses which are typically soft or oily as a result of feeds producing soft or oily fat may be graded in accordance with the standards provided they are identified as soft or oily along with the grade.

There are differences in the bellies of sow carcasses which are peculiar to the class. Increasing numbers of litters farrowed and raised by a sow results in greater development of mammary tissue and increasing roughness of the belly along the teat line with accompanying seediness. In addition, when pigs were weaned only a short time before the sow was slaughtered the mammary tissue still contains milk and the bellies are commonly termed "wet". However, the smoothness or dryness of bellies has little appreciable effect on the basic grade determining factors and the standards contain no provision for altering the grade of a sow carcass due to these belly characteristics. Rather than forming a part of the basis for grade, it is the intent of the standards that smoothness and dryness of bellies should be a separate consideration used in conjunction with grade, weight, and other factors in evaluating sow carcasses.

Average back fat thickness measurements provide a reliable indication of the yields of cuts and the quality of cuts which determine the grade of sow carcasses. Therefore, indication of a specific range in back fat thickness for each grade forms a part of the standards for grade. Analysis of measurement and cutting data

for sow carcasses reveals that yields of cuts are approximately equal in carcasses which are equal in fat thickness but widely different in weight. Thus, to maintain comparable yields in a grade at all weights, back fat thickness requirements for a grade are the same at all weights. This is in contrast to the standards for barrows and gilts, in which the fat thickness for a grade increases for heavier or longer carcasses in order to maintain yields of cuts. With practice in the grading operation, visual estimates of fat thickness may often replace actual measurements with satisfactory accuracy. The following table of measurements provides an objective guide in determining the grade of sow carcasses.

| Grade: | Average back fat thickness ¹ |
|-----------------------|---|
| U. S. No. 1 - - - - - | 1.5 to 1.9 inches. |
| U. S. No. 2 - - - - - | 1.9 to 2.3 inches. |
| U. S. No. 3 - - - - - | 2.3 or more inches. |
| Medium - - - - - | 1.1 to 1.5 inches. |
| Cull - - - - - | Less than 1.1 inches. |

¹Average of three measurements, skin included, made opposite first and last ribs and the last lumbar vertebra.

In addition to the measurement guides to grade, the standards also include descriptive specifications outlining the characteristics of sow carcasses typical of the minimum degree of finish for each grade. Average back fat thickness is a major factor in grading, but more accurate appraisal of yields of cuts and quality of cuts is achieved in borderline cases by consideration of thickness of muscling, conformation of the major cuts, uniformity of fleshing and finish, firmness, and indications of marbling. However, in no case may the final grade of a carcass be more than one-half the width of a grade different from that indicated by average back fat thickness.

The standards described rather typical carcasses of each grade, and no attempt is made to describe the numerous combinations of characteristics that may qualify a carcass for a particular grade.

SPECIFICATIONS FOR OFFICIAL UNITED STATES STANDARDS FOR GRADES OF SOW CARCASSES

U. S. NO. 1

U. S. No. 1 grade sow carcasses have about the minimum degree of finish required to produce pork cuts of acceptable palatability. Meatiness and yield of lean cuts from carcass weight are slightly high. Yield of fat cuts is slightly low. The ratio of total lean and fat to bone is slightly high. Carcasses with the minimum finish required for U. S. No. 1 grade are moderately long and slightly wide in relation to weight. The back and loins are moderately full and thick with a well-rounded appearance. Hams are usually moderately thick and plump and are slightly full in the lower part toward the hock. Bellies are moderately long, slightly thick, and moderately uniform in thickness with a slightly thick belly pocket. Shoulders are slightly thick and full. Carcasses are usually moderately well-balanced and moderately uniform in fleshing and

finish. There are moderate quantities of interior fat in the pelvic area, a slightly thin but moderately extensive layer of fat lining the inside surface of the ribs, and a slightly small quantity of feathering, or fat intermingled with the lean between the ribs. The lean is firm. Both exterior and interior fats are firm, white, and of excellent quality. Carcasses with back fat thickness qualifying them for the fatter one-half of the U. S. No. 1 grade but with thin muscling in the major cuts, uneven fleshing and finish, or thick and uneven bellies shall be graded U. S. No. 2. Carcasses with back fat thickness qualifying them for the thinner one-half of the U. S. No. 1 grade but with only a moderately thin and incomplete rib lining, a moderately small quantity of feathering, slightly thin bellies with moderately thin belly pockets, and moderately soft lean and fat shall be graded Medium.

U. S. NO. 2

U. S. No. 2 grade sow carcasses have a higher degree of finish than the minimum required to produce pork cuts of acceptable palatability. Meatiness and yield of lean cuts from carcass weight are slightly low. Yield of fat cuts is slightly high. The ratio of total lean and fat to bone is moderately high. Carcasses with the minimum finish required for U. S. No. 2 grade are slightly short and moderately wide in relation to weight. The back and loins are full and thick and are especially full near the edges. Hams are usually thick and plump and are moderately full in the lower part toward the hock. Bellies are slightly short, moderately thick, and rather uniform in thickness with a moderately thick belly pocket. Shoulders are moderately thick and full. Carcasses are usually well-balanced and uniform in fleshing and finish. There are slightly large quantities of interior fat in the pelvic area, a slightly thick and rather extensive layer of fat lining the inside surface of the ribs, and moderate feathering. The lean is firm. Both exterior and interior fats are firm, white, and of excellent quality. Carcasses with back fat thickness qualifying them for the fatter one-half of the U. S. No. 2 grade but with thin muscling in the major cuts, uneven fleshing and finish, or very thick and uneven bellies shall be graded U. S. No. 3. Carcasses with back fat thickness qualifying them for the thinner one-half of the U. S. No. 2 grade but with thick muscling in the major cuts, well-balanced fleshing and uniform finish, and slightly thick bellies shall be graded U. S. No. 1.

U. S. NO. 3

U. S. No. 3 grade sow carcasses have a decidedly higher degree of finish than the minimum required to produce pork cuts of acceptable palatability. Meatiness and yield of lean cuts from carcass weight are low. Yield of fat cuts is high. The ratio of total lean and fat to bone is high. Carcasses with the minimum finish required for U. S. No. 3 grade are short and wide in relation to weight. The back and loins are very full and thick and are decidedly full at the edges. Hams are usually very thick and plump and are full in the lower part toward the hock due to a thick fat covering. Bellies are short and thick and uniform in thickness with a thick belly pocket. Shoulders are thick and full. Carcasses are usually well-balanced and uniform in fleshing and finish. There are large quantities of interior fat in the pelvic area,

a moderately thick and extensive layer of fat lining the inside surface of the ribs, and slightly abundant feathering. The lean is firm. Both exterior and interior fats are firm, white, and of excellent quality. Carcasses with back fat thickness indicative of nearly minimum finish for the U. S. No. 3 grade but with thick muscling in the major cuts, well-balanced fleshing and uniform finish, and moderately thick bellies shall be graded U. S. No. 2.

MEDIUM

Medium grade sow carcasses have a lower degree of finish than the minimum required to produce pork cuts of acceptable palatability. Yield of lean cuts from carcass weight is moderately high. Yield of fat cuts is moderately low. The ratio of total lean and fat to bone is moderately low. Carcasses with the minimum finish required for Medium grade are long and rather narrow in relation to weight. The back and loins are rather thin, lack fullness, and slope away from the center. Hams are usually slightly thin, lack plumpness, and taper toward the hock. Bellies are long and moderately thin and are somewhat uneven in thickness with a thin belly pocket. Shoulders are moderately thin and flat. Carcasses tend to be uneven and lack uniformity of fleshing and finish. There are slightly small quantities of interior fat in the pelvic area, a thin and incomplete layer of fat lining the inside surface of the ribs, and only a small quantity of feathering. The lean is moderately soft with little evidence of marbling. Both exterior and interior fats are moderately soft, white to creamy white, and of moderately low quality. Carcasses with back fat thickness qualifying them for the fatter one-half of the Medium grade that are firm and have slightly thick bellies and belly pockets, a slightly thin but moderately extensive rib lining, and a slightly small quantity of feathering shall be graded U. S. No. 1. Carcasses with back fat thickness qualifying them for the thinner one-half of the Medium grade but with little or no rib lining and feathering, thin bellies and very thin belly pockets, and soft lean and fat shall be graded Cull.

CULL

Cull grade sow carcasses have a decidedly lower degree of finish than the minimum required to produce pork cuts of acceptable palatability. Yield of lean cuts from carcass weight is high. Yield of fat cuts is low. The ratio of total lean and fat to bone is low. Carcasses with the degree of finish typical of the Cull grade are long and narrow in relation to weight. The back and loins are thin and decidedly lacking in fullness with a definite slope toward the sides. Hams are usually thin and flat and taper toward the hock. Bellies are very long and thin and are uneven in thickness with a very thin belly pocket. Shoulders are thin and flat. Carcasses tend to be uneven and lack uniformity of fleshing and finish. There are only small quantities of interior fat in the pelvic area, little or no fat lining the inside surface of the ribs, and scant feathering. The lean is soft and watery with very little evidence of marbling. Both exterior and interior fats are soft, creamy white to white, and of low quality. Carcasses with back fat thickness indicative of nearly maximum finish for the Cull grade that are only moderately soft and have moderately thin bellies and belly pockets, a thin and incomplete rib lining, and a small quantity of feathering shall be graded Medium.

